

WHAT IS CLAIMED IS:

1. A collision detection method for use in a multiple access communication system with a common channel, comprising steps of:
 - transmitting a signal including a predetermined segment to said common channel;
 - receiving said signal from said common channel;
 - processing said signal to obtain an error term associated with said predetermined segment;
 - performing a mathematical operation on said error term to obtain an index value; and
 - determining whether a collision occurs by comparing said index value with a threshold value.
2. The collision detection method according to claim 1 wherein said predetermined segment is a preamble of a packet with a constant sequence.
3. The collision detection method according to claim 2 wherein said error term is obtained by equalizing said signal, and comparing a section of said equalized packet directing to said constant sequence with a predetermined sequence.
4. The collision detection method according to claim 3 wherein said multiple access communication system is a HomePNA 2.0 system.
5. The collision detection method according to claim 4 wherein said constant sequence is a TRN16 sequence.
6. The collision detection method according to claim 1 wherein said index value is a mean square value of said error term.
7. The collision detection method according to claim 1 wherein said index value is a maximum absolute value of said error term.

8. The collision detection method according to claim 1 wherein said index value is a mean absolute value of said error term.
9. The collision detection method according to claim 1 wherein said index value is an Nth order metric of said error term.
10. The collision detection method according to claim 1 wherein said error term is mathematically operated by using a real part thereof.
11. The collision detection method according to claim 1 wherein said error term is mathematically operated by using an imaginary part thereof.
12. The collision detection method according to claim 1 wherein said error term is mathematically operated by using a combination of a real part and an imaginary part thereof.
13. A collision detection apparatus for use in a multiple access communication system between a station and a common channel, comprising:
 - a signal processing device for receiving a signal including a predetermined segment, and comparing said signal with a predetermined signal to obtain an error term associated with said predetermined segment;
 - a mathematical operator electrically connected to said signal processing device for mathematically operating said error term to obtain an index value; and
 - a collision detection device electrically connected to said mathematical operator for determining whether a collision occurs according to said index value.
14. The apparatus according to claim 13 wherein said signal processing device processes said signal to obtain information data bits of said

signal and said error term.

15. The apparatus according to claim 14 further comprising an adaptive equalizer electrically connected to said signal processing device for adjusting a waveform of said signal according to said error term.
16. The apparatus according to claim 13 wherein said multiple access communication system is a HomePNA 2.0 system.
17. The collision detection method according to claim 16 wherein said predetermined segment includes four repetitive TRN16 sequences.
18. The apparatus according to claim 13 wherein said mathematical operator is a mean-square-value calculator.
19. The apparatus according to claim 13 wherein said mathematical operator is a maximum-absolute-value selector.
20. The apparatus according to claim 13 wherein said collision detection device is further electrically connected to a channel accessing device to allow said station to access said common channel when no collision is determined.
21. The apparatus according to claim 13 wherein said collision detection device determines that said collision occurs when said index value is greater than a threshold value.
22. The apparatus according to claim 13 mounted at a receiver end of said station.
23. The apparatus according to claim 22 wherein said signal is outputted from a transmitter end of the same station.